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The Changing Patterns of Indonesian Food Consumption and their Welfare Implications

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Changing Patterns of Indonesian Food Consumption and their Welfare Implications

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Abstract

Despite KrisMon, Indonesian real food expenditures grew 7.5% from 1996 to 2002. This was the net result of a 14% decline from 1996 to 1999 followed by a 24% rebound from 1999 and 2002. Real food expenditure of the poor increased by 7.9% over this same period. High quality foods, such as eggs, fish, fruit, vegetables, fats and oils, beans and nuts and prepared foods led these increases. Per capita consumption of grains, on the other hand, declined by 8%, due to increased rice prices. Susenas consumption surveys are the basis for these apparent improvements in real nutritional welfare. If confirmed, these findings are an important input for national food policy decisions: recent improvements in nutritional welfare indicate the effects of the deregulation of domestic and international food markets implemented between 1999 and 2003. But there is not yet a consensus about this recovery. These findings differ from several other measures of nutritional and economic welfare. We argue that, compared with other measures, these Susenas-based real food consumption measures are more reliable.

These results suggest that improved nutrition and food security can benefit quickly from increased incomes. And as incomes increase Indonesian consumers can quickly diversify their consumption out of rice and into higher valued foods. Indonesian agricultural policies should not be overly focused on low valued crops. They should also help farmers find and profit from their comparative advantages in a wide range of agricultural commodities

Meskipun KrisMon, pengeluaran untuk makanan secara ril di Indonesia mengalami kenaikan sebesar 7.5% dari tahun 1996 sampai dengan 2002. Kenaikan ini muncul dari penurunan sebesar 14% dari tahun 1996 s/d 1999, diikuti oleh kenaikan sebesar 24% dari tahun 1999 s/d 2002. Dan bagi penduduk miskin pengeluaran tersebut meningkat 7.9% pada period yang sama. Jenis makanan yang meningkat paling cepat adalah yang bernilai tinggi, misalnya telur, ikan, kacang-kacangan, sayur-sayuran, buah-buahan, makanan berlemak, makanan jadi, dan makanan yang di makan diluar rumah. Sebaliknya makanan yang berasal dari padi-padian menurun 8%, disebabkan oleh menurunnya konsumsi beras. Peningkatan kesejahteraan gizi tersebut dibuktikan oleh Survei SUSENAS. Jika benar, temuan ini merupakan *input* penting bagi kebijakan pangan dan gizi nasional. Indikasi kesejahteraan gizi ini dapat dipakai untuk menilai dampak *deregulasi* perdagangan pangan yang dilaksanakan selama tahun 1999 s/d 2003. Tetapi, belum ada konsensus mengenai kemajuan ini; temuan lain mengindikasikan bahwa kesejahteraan gizi belum membaik sejak KrisMon. Kami menyarankan untuk menggunakan pengeluaran makanan ril dari survei SUSENAS sebagai indikator paling tepat untuk mengetahui status kesejahteraan gizi.

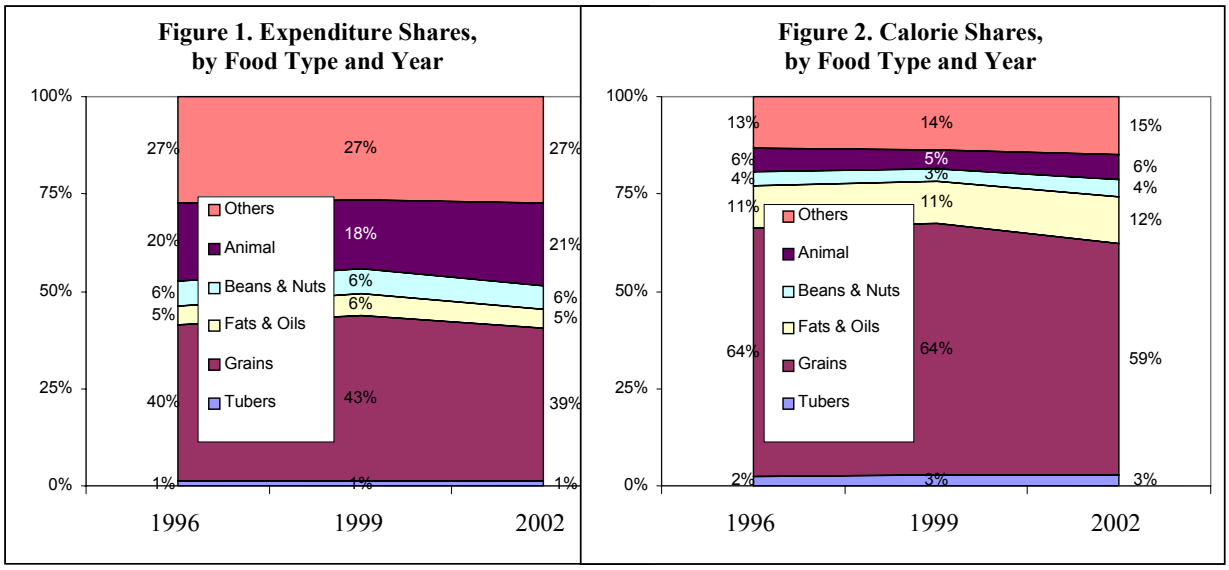
Temuan ini juga mengindikasikan bahwa kemajuan status gizi dan ketahanan pangan sangat tergantung kepada kenaikan pendapatan. Selama pendapatan masyarakat Indonesia terus naik, mereka akan menyesuaikan pola konsumsinya, termasuk mengurangi nasi dan meningkatkan makanan yang bernilai lebih tinggi. kebijakan pertanian Indonesia tidak seharusnya hanya terfokus pada produksi pertanian yang bernilai rendah. Akan lebih baik jika kebijakan dapat membantu petani untuk menemukan dan memperoleh keuntungan dari "*comparative advantage*" dalam memproduksi berbagai macam komoditi pertanian.

Overview

Recent measures of food consumption suggest remarkable improvements in the quality of Indonesian diets since the peak of the 1997/8 financial crisis, particularly for the poor. These improvements follow the severe deterioration brought about by the crisis; they even indicate real improvements relative to 1996. To better understand the nature of changes in food consumption, this note explores food consumption patterns in the 1996, 1999 and 2002 Susenas consumption surveys. The welfare implications of these patterns stand in sharp contrast to other widely used measures of economic welfare. We present strong reasons to believe that these food consumption results are the most credible of these disparate measures. We discuss a number of implications stemming from these findings.

Nominal Food Expenditure Patterns and Growth

Figures 1 and 2 display the distribution of expenditure and calorie shares by six broad categories of foods. Grains, as a relatively inexpensive source of calories, accounted for about 40% of food expenditures in 1999, but over 60% of caloric intake. Animal-based foods, and "Others"[1] are relatively expensive sources of calories that are much richer in proteins and micronutrients. They account for only 20% of calories, but nearly 50% of food expenditures.



Source: BPS, 1996, 1999 and 2002 Susenas Consumption Module (tobacco and alcohol excluded).

[1] Made up principally of prepared and processed foods, as well as vegetables, fruits and spices.

Table 1. Per-capita Average Nominal Monthly Food Expenditures*, 1996-2002

	Grains & Tubers	Fats & Oils	Beans & Nuts	Animal-based foods	Others	Total
1996	13,433	1,671	2,164	8,520	9,946	35,734
1999	33,109	4,209	4,848	16,374	21,528	80,068
2002	41,743	4,794	6,583	26,740	30,516	110,376
Increase						
'96-99	146%	152%	124%	92%	116%	124%
'99-02	26%	14%	36%	63%	42%	38%
'96-02	211%	187%	204%	214%	207%	209%

Source: 1996, 1999 & 2002 Susenas Consumption Module (Current Rupiah)
* Tobacco and alcohol expenditures are excluded

Table 1 displays the average per-capita monthly nominal food expenditures by each of the above categories in 1996, 1999 and 2002. Overall nominal food expenditure more than doubled in the first three years, and then grew by 38% over the next implying a six-year increase of 208%. The overall growth in expenditures on starches (i.e., tubers and grains) was essentially the same over the six-year period, but most of the growth occurred early in the crisis ('96-'99.) Growth in animal-based foods' expenditures was marginally higher than that of starches over the six-year period, but the three-year breakdown differed sharply. Where starches grew in relative importance from '96 to '99, these higher quality foods declined. And when starches declined in relative importance from '99 to '02, animal-based foods more than compensated.

Real Food Consumption – Nutrient Measures

Figure 3 displays the profiles of calories by expenditure decile for these commodities. This reveals a principal finding of this note: the changes in consumption *patterns* through the crisis may reveal as much or more about welfare than the changes in overall *levels* do. Part of the reason for this is suggested by the shapes of the Tuber and Grain income curves. They show that starch consumption is a classic inferior good: consumption peaks in the upper half of the income distribution, then declines for the wealthiest. Clearly declines in inferior goods like starches do not necessarily imply welfare declines. By contrast, the remaining food groups are all normal goods: consumption increases with income across all income deciles.

The interesting shifts in consumption patterns are most evident comparing starches (Tubers and Grains) with Beans and Nuts, or Others. Starches declined 5-10% across all income groups from 1996 to 1999. And, except for the poorest third of the population, they declined even further from 1999 to 2002, leading to an overall decline of 103 daily calories per-capita from starches. Beans and Nuts, as well as Other foods also declined sharply from 1996 to 1999. But from 1999 to 2002 they more than recovered, surpassing their 1996 levels by 50 calories. The overall effect is shown in the Total graph: after the 1996 to 1999 shock, the 1999 to 2002 recovery left overall caloric intake

marginally (33 calories) below their 1996 levels. If welfare were based on calories alone, this reveal an overall welfare decline. But consumers care about the quality of their diets, not just the calories. And since calories in the high-valued food groups cost three to four times the calories from starches, the reduction in calories actually represents a shift to a more highly valued, but lower calorie diet from 1996 to 2002.

Some analysts consider Figure 4 to be the most revealing of Indonesia's changing consumption patterns. It shows nutrient-expenditure gradients for calories, fats, proteins and carbohydrates. The calorie figures are identical to those shown in Figure 3. The changes in fat consumption are similar to calories: the recovery from 1999 to 2002 is less than complete, with both calories and fats in 2002 marginally below their 1996 levels. For proteins, the recovery from 1999 to 2002 is complete, with overall per-capita protein levels statistically indistinguishable between 1996 and 2002. The most distinguishable graph among these is that for carbohydrates. For this relatively inexpensive nutrient, there was little or no recovery from 1999 to 2002. By 2002, the poorest third of the population recovered only about half of the carbohydrates they lost from 1996 to 1999. But for the wealthiest fifth of the population, carbohydrate consumption remains below even their sharply depressed 1999 levels.

Real Food Consumption – Expenditure Measures

The effects of the rapid crisis-induced inflation must be purged in order to evaluate changes in real expenditures. Appropriately deflated, changes in real expenditures reflect changes in the physical quantities of food consumed. But the choice of which deflator to use can influence relative prices and the magnitude of real expenditures. Consequently Table 2 summarizes the changes using several different food price indices. The commonly used Laspeyres index, based on aggregate, expenditure-weighted national consumption patterns, evaluates changes in the cost of living from 1996 through 2002. Two other price indices are also reported: an expenditure-weighted Tornqvist price index which uses the same aggregate consumption quantities and expenditures as the Laspeyres, but allows for some substitution due to changes in relative prices; and a population-weighted Tornqvist index.[2] Although not as commonly used as Laspeyres indices, Tornqvist indices may be better suited for evaluating welfare impacts of price and expenditure changes, as they implicitly allow for some substitution of goods as relative prices change. And using population weights ensures that cost of living changes are not dominated by the consumption patterns of the wealthy.

[2] Expenditure-weighted indexes are the most commonly used price indexes but are more reflective of price changes experienced by higher income groups, since these groups account for a disproportionate share of total spending.

Table 2. Food Price Index Changes, 1996-2002

Index	Tubers	Grains	Fats & Oils	Beans & Nuts	Animal-based	Others	Total
Tornqvist-P '96-'02	185%	220%	149%	157%	198%	157%	189%
Tornqvist-E '96-'02	196%	213%	151%	155%	193%	151%	184%
Laspeyres-E '96-'99	170%	166%	180%	147%	163%	147%	159%
Laspeyres-E '99-'02	16%	18%	-8%	6%	13%	6%	12%
Laspeyres-E '96-'02	200%	214%	151%	163%	194%	158%	187%

Source: 1996, 1999 and 2002 Susenas data.[3]
P=population weights
E=expenditure weights

We note that the prices used here are not *pure* prices; in all calculations presented, the prices are actually unit values – expenditures divided by quantities, which theoretically can yield biased price estimates. But because of the high level of detail in the consumption items listed, their deviation from pure prices has a trivial impact on our findings. The details of the comparison of unit values and prices are discussed briefly in the appendix.

The overall food inflation from 1996 to 2002 is in the range of 184% - 189%, suggesting that the differences among methods are only a marginal part of the story. But differences in the movement of relative prices is more important. Tuber prices, for example, grew 15 percentage points slower using the democratic Tornqvist-P compared with the Laspeyres, while grain prices grew six percentage points faster. This reveals an important change – roughly 10% – in the relative prices of the two food groups, due to the choice of deflators. The Tornqvist index, since it accounts for consumer substitution, is generally regarded to be a theoretically preferred indicator, if data on both prices and quantities at two points in time are available.[4] But because the overall differences are small, for the balance of the paper expenditure-weighted Laspeyres will be used to deflate consumption. This will facilitate comparison between our results and other data sources. The Laspeyres price index also has the advantage that expenditures deflated by it are algebraically identical to a Paasche quantity index.

Substantively, there were important changes in relative prices that affected the composition of Indonesian diets. The prices of starches (tubers and grains) grew 200-215% from 1996 to 2002, while prices of fats & oils, beans and nuts, and other foods grew only about three-fourths that rate, implying a 25% increase in the relative prices of starches. Animal based food prices also grew faster than average, growing almost as fast as starches over the six year period. In light of these changing

[3] The Laspeyres formula weighted households in proportion to total household spending. The Tornqvist indices were calculated using two methods. Tornqvist-P (democratically-weighted) used item- and location-specific median unit-values as prices; indices were calculated as expenditure share weighted logged prices, where expenditure shares are calculated as population-weighted mean household shares. The Tornqvist-E (expenditure weighted) indices use the same national expenditures and quantities as those used in the Laspeyres index to calculate national expenditure shares and unit values (prices.) All indices exclude cigarettes and alcohol.

[4] Deaton and Muellbauer (1980) present a good consumer welfare based discussion of alternative price indexes.

relative prices, it should not be surprising that starches experienced the largest real declines in Figure 3, while fats and oils, beans and nuts, and other foods experienced the largest increases. Most surprising – and a clear indication of the magnitude of the real income effect – is that animal-based foods, which also experienced significant relative price increases, still managed to recover to their 1996 levels.

Table 3 assigns both monetary and calorie values to these levels of real (Laspeyres-E deflated) food expenditures and calorie consumption of the food groups. Overall, real food consumption increased 7.5% from 1996 to 2002. Recall the implication of the equivalence between Laspeyres-deflated real expenditures and a Paasche quantity index: the physical quantity of foods consumed – weighted by 2002 prices – also increased 7.5%. But despite this increased volume of food consumed, Table 3 also shows that caloric intake remained two percent below pre-crisis levels.

This overall decline in calorie consumption occurs in spite of real income increases due to the combined effects of the low income elasticity for starches, and the substitution out of starches due to their increased prices. By contrast, both real income increases and declining relative prices have led to the rapid real growth of fats and oils, and of higher quality foods – beans and other foods. These groups grew 14-19% in real terms, and 10-15% in calorie terms. The discrepancy between the "other" food calorie and real expenditure increases is another indication of real income increases. More expensive food items generally have higher income elasticities, so income growth shifts consumption towards these more costly goods. Though these shifts are associated with higher incomes and welfare, this increases the average cost per calorie, causing calorie growth to lag behind real expenditure growth.

Table 3. Real Food Consumption: Per-Capita Deflated Monthly Expenditures and Daily Calorie Consumption, Indonesia, 1996, 1999 and 2002

	Tubers & Grains	Fats & Oils	Beans & Nuts	Animal-based	Others	Total
Deflated Expenditures						
1996	13,433	1,671	2,164	8,520	9,946	35,734
1999	12,463	1,504	1,959	6,231	8,713	30,870
2002	13,321	1,909	2,504	9,089	11,845	38,414
%Change						
'96-'99	-7.2%	-10.0%	-9.5%	-26.9%	-12.4%	-13.6%
'99-'02	6.9%	27.0%	27.8%	45.9%	35.9%	24.4%
'96-'02	-0.8%	14.3%	15.7%	6.7%	19.1%	7.5%
Calories Consumed						
1996	1,330	219	74	125	272	2,020

1999	1,236	203	65	89	255	1,849
2002	1,227	246	85	129	300	1,987
%Change						
'96-'99	-7%	-7%	-12%	-29%	-6%	-8%
'99-'02	-1%	21%	31%	45%	18%	7%
'96-'02	-8%	13%	14%	3%	10%	-2%

Source: Tabulations of 1996, 1999 and 2002 Susenas consumption module data. Tabulations omit alcohol and tobacco. To ensure comparability, they also omit data from Aceh, Maluku and Papua, as these areas were not surveyed in 2002. Deflated expenditures use Laspeyres price indexes with a 1996 base-year.

Due to the crisis, from 1996 to 1999 real food expenditures declined by 13.6% while caloric intake declined by 8%. The difference between calorie and real expenditure declines was the reverse of the composition changes seen from 1999 to 2002. It reflects the composition effects of declining real incomes. Households protected their caloric intake by sharply reducing the higher valued foods – especially animal-based products, which declined by nearly 30% – while only moderately reducing their expenditures on relatively cheaper, inferior starches. Again, the highly heterogeneous "other" food category shows similar movements *within* the group. Real expenditures on this food group declined by 12%, but calories declined only 6%.

The recovery of real food expenditures from 1999 to 2002occurred at a very rapid rate. Welfare improvements are evident in both the levels and the compositions between food groups and within relatively heterogeneous ones. Real expenditures increased a surprising 24% over this period. This implies that *real* foods increased, on average, more than seven percent *per year*. These imply are far larger household income increases than the National Income Accounts report. With Indonesian Engel elasticities typically in the range of 0.7, these are food expenditure increases that would require 10% or greater rates of real income growth per annum. This suggests that if these food expenditure patterns were driven solely by income changes, real household income growth since the crisis must be even higher than the suggested 10% annual rates.

Consistent with the notion that these real expenditure increases were related to welfare improvements, growth was concentrated in the highest quality or cost food groups. Animal-based products, including fish, dairy and eggs, grew the fastest, at 46%. "Other foods," which include vegetables, fruit, and many processed and prepared foods, grew by 36%. Basic starches (grains and tubers), which are characterized by especially low income elasticities, grew only 7% between 1999 and 2002, well behind the 24% growth in total food consumption. Some of this may reflect a substitution out of starches and into higher quality foods due to changes in their relative prices. But the increased expenditures on high quality foods far outweighed the value of the starch declines.

From 1999 to 2002 the shift out of starches and into higher quality foods caused deflated food expenditures to grow 24% while calories grew only 7%. Similarly, within the "Others" food group (a

very heterogeneous group, including vegetables, fruits, various processed foods and foods consumed outside the household), deflated expenditures grew 19% from '96-'02, while calorie consumption grew only 10%. The details of these consumption shifts can be seen in the composition of the "Other" foods, which is presented in Table 4.[5] This quality improvement was partly due to shifts to higher valued prepared foods and drinks (prepared foods and drinks account for 30-40% of "Other" food expenditures.) But it was also due to the combined effects of increasing quantities of fruits and vegetables, as well as a shift towards higher priced vegetables and fruits. From 1999 to 2002 fruit and vegetable calories grew 16% and 26%, respectively, and their deflated expenditures grew two to three times more than their total calories.

The remaining food groups are more homogeneous, so the calorie and real expenditure increases are more similar. For example, the '96-'99 decline and subsequent '99-'02 growth of animal-based calories corresponded closely to the decline and subsequent growth in real expenditures. This was also roughly true of fats and oils, and beans and nuts.

In addition to clarifying how the quality of food consumption has changed, Table 4 reveals another important insight to the changing structure of Indonesian food consumption. It indicates that there has been a boom in the expenditures on fruits and vegetables. Household expenditures on fruits and vegetables are now 65% of their expenditures on rice. And their rate of increase is even more remarkable: from 1999 to 2002 fruits grew 86% while vegetables grew 30%, implying a 47% overall growth. If consumption were to continue to grow at this pace, Indonesian fruit and vegetable expenditures would *exceed* rice expenditures by the year 2006. Moreover, fruit and vegetable production is generally more labor intensive than rice production. Consequently, if Indonesian farmers can make the switch from low value rice to high value horticulture, much of this growth will directly benefit farm labor and small landholders (*petani gurem*) who will never earn satisfactory incomes producing rice.

[5] Table 4 is only a crude breakdown of the components of "Other" foods as the expenditures and calories do not add-up to the totals in Table 3. The categories in Table 4 are consistent with BPS consumption category definitions, while the six-item groupings used in Table 3 assigns identifiable components of processed and prepared foods (e.g., noodles, fried rice, etc.) to their corresponding six-item food group.

Table 4. Monthly Per-Capita Deflated Expenditures and Calories: Components of "Other" Foods

	Veggies	Fruit	Sugar & Drink Mixes	Spices	Processed foods	Prepared foods & drinks
Deflated Expenditures						
1996	3,470	2,060	2,083	984	924	6,097
1999	3,119	1,372	1,869	765	773	5,816
2002	4,047	2,554	2,344	1,049	1,129	6,932
%Change						
'96-'99	-10%	-33%	-10%	-22%	-16%	-5%
'99-'02	30%	86%	25%	37%	46%	19%
'96-'02	17%	24%	13%	7%	22%	14%
Calories Consumed						
1996	36	40	113	16	35	173
1999	32	32	102	16	29	174
2002	37	41	120	18	42	198
%Change						
'96-'99	-11%	-20%	-9%	-1%	-16%	0%
'99-'02	16%	26%	17%	18%	42%	14%
'96-'02	3%	1%	6%	17%	19%	14%

Source: See Table 3.

The implications for agricultural policy seem clear. Policymakers should stop devoting scarce resources and political influence to efforts to restrict international trade in low-value agricultural products. The poor pay heavily for this protection, including the rural poor, with the primary beneficiaries being landowners and those who obtain import rights. Indonesian agricultural policy should instead follow the example of Indonesian consumers and small farmers by seeking opportunities to efficiently shift consumption and production out of cereals and sugar, which are land-intensive, low-valued, inferior goods, and into high-quality fruits and vegetables, which are labor-intensive, high in micro-nutrients, and more highly valued, here and abroad.

Deflated Food Expenditures of the Poor

Tables 3 and 4 displayed what has happened to average household expenditures. They do not indicate specifically how the poor fared through the crisis. Table 5 examines the deflated expenditure patterns of the poorest 20% of the population. The table indicates that the deflated food expenditures of the poor grew by 22% from 1999 to 2002. This represents a 7.9% increase in deflated expenditures relative to the pre-crisis level (1996 to 2002) – marginally higher than the increase for the total population.

While the poor's deflated expenditure increase was only marginally larger than that of the total population, the proportional specific changes tend to be much larger. For Starches, Beans & Nuts, and Animal based foods, the absolute value of percent changes reported by the poor are roughly

double the corresponding total population changes, and Fats & Oils are 50% larger. This leaves only the Other category where the relative changes are comparable between the poor and the total population.

Table 5. Poorest 20%: Deflated Per-Capita Food Expenditures and Calorie Consumption

	Tubers & Grains	Fats & Oils	Beans & Nuts	Animal-based foods	Others	Total
Real Expenditures						
1996	9,070	1,026	1,090	2,251	4,499	17,936
1999	8,298	870	1,032	1,619	3,964	15,750
2002	8,900	1,247	1,393	2,526	5,429	19,348
%Change						
'96-'99	-8.5%	-15.2%	-5.3%	-28.1%	-11.9%	-12.2%
'99-'02	7.3%	43.3%	35.0%	56.0%	37.0%	22.8%
'96-'02	-1.9%	21.5%	27.8%	12.2%	20.7%	7.9%
Calories Consumed						
1996	1,239	147	43	45	173	1,647
1999	1,108	127	39	32	163	1,469
2002	1,140	174	54	48	199	1,614
%Change						
'96-'99	-11%	-13%	-11%	-29%	-6%	-11%
'99-'02	3%	37%	39%	49%	22%	10%
'96-'02	-8%	19%	24%	5%	15%	-2%

Source: See Table 3.

An interesting finding in this table relates to how food consumption patterns have changed. From 1996 through 2002 there was a clear substitution out of tubers and grains, reducing the cheaper source of calories by 10%, which can be attributed, at least partially, to the increased relative price of rice. As tubers and grains contributed three-fourths of total calories, this decline represents a 7.5% share of total calories. More than half of this decline was offset by increases in calories from fats and oils, and from the higher quality "other" foods. The substantial increases in real expenditures were driven primarily by the higher quality "other" foods.

It should also be noted that while the reported real expenditures of the poor increased by about the same amount as real expenditures for the whole population, these findings are based on the assumption implicit in the use of Laspeyres indexes that consumption patterns are not affected by relative prices. That is, in order to reach the same Laspeyres deflated expenditure level, consumers must be able to purchase the same basket of goods as that consumed in the base year. Yet changes in relative prices cause substitution into relatively cheaper commodities; consequently, Laspeyres-deflated expenditure numbers understate changes in real welfare. Therefore, the measures of deflated food expenditures presented here are likely to understate the improvements in the welfare derived from food consumption. This downward bias is referred to as the substitution bias, which is larger for

consumers who are more responsive to relative price changes. And since the poor are typically more price responsive than the wealthy, we expect this substitution bias to be especially high for the poor.

One question that can be raised about these data is, if real food consumption increased so pervasively, why did total caloric intake decline by 2% from 1996 to 2002? While a detailed analysis of why households chose the calorie levels that they did is beyond the scope of this paper, it is important to note that with 2002 food expenditures and prices these poor households *could* have maintained their 1996 caloric intake *and* increased their consumption of high quality foods over their 1996 levels. Table 6 demonstrates this for the poor. The "Actual" rows report nominal expenditures and caloric intake for rice, animal-based foods and others. The "Adjusted" rows indicate what those expenditures and calories would have been if the poor were to shift approximately 5% of their expenditures from these high-quality foods to rice, leaving total expenditures (and the expenditure allocations within these categories) fixed.

This table demonstrates that by reducing Other Foods and Animal-Based Foods by 5%, and using these savings to increase rice consumption by 5%, the poor could have maintained their 1996 calorie consumption levels *still* increased the quality of their diets relative to 1996. In other words, the amount that poor households spent on food in 2002 was sufficient to maintain 1996 per capita caloric intake and allow a substantial increase in consumption of high quality foods. Therefore the reduction in calories from 1996 to 2002 reflected, in part, the effect of current preferences for more quality foods and fewer calories, compared with 1996.

Table 6. Low or High Quality Foods in 2002:
Actual and Hypothetic Expenditures and Caloric Intake for Selected Foods

	A. Rice	B. Animal-based	C. Others	Sum(A-C)
Nominal Expenditures:				
Actual 2002	22,535	8,014	14,726	45,275
Adjusted 2002	23,594	7,641	14,040	45,275
Caloric Intake:				
Actual 2002	953	48	199	1,199
Adjusted 2002	998	45	189	1,233
Actual 1996	1,003	45	173	1,222
% Adjustment	4.7%	-4.7%	-4.7%	2%*

* The difference between Actual and Adjusted 2002 calories represents 2% of the total 2002 caloric intake.

Comparisons with Other Measures of Welfare

Three important, and independent sets of indicators suggest that 2002 levels of real income, or welfare, remained well below pre-crisis levels. Since our findings are so sharply at odds with these indicators, and because these indicators are based on different data sources, we evaluate the credibility of our findings relative to these others. An additional set of welfare measures, the poverty head-counts calculated by Statistics Indonesia (BPS, 2003b) and the World Bank (REFS?) also differ from those presented here. But these differences are relatively small, suggesting that the poor are nearly as well off as they were prior to the crisis, while the results here suggest the poor are marginally better off. But these minor differences are much less interesting than the large differences; they are likely due to the differing methodologies. Moreover, the broad similarities of our results and the poverty measures are not especially insightful, since they are all based on the same Susenas consumption data.

The three sets of findings that are at odds with ours all suggest that the Indonesian economy remains well below pre-crisis levels, but apart from this similarity, these three indicators are largely inconsistent with one another. Moreover, and each has its own significant technical problems, and/or problems of interpretation. These include the following:

- BPS's National Income (NI) estimates suggest that per-capita incomes have grown relatively little since the low-point of the crisis (BPS, 2003.) More detailed national income accounts data indicate that real per capita food expenditures *fell* by 1% between the first quarter of 1999 and the first quarter of 2002 – a period of time during which the Susenas survey shows a 24% *increase*.

- Real agricultural wage data suggest that, while real agricultural wages began to recover quickly after the low-point of the crisis, they remain 10-15% below their pre-crisis levels (Papanek, 2004.)

- The nutritional status of children, as indicated by weight-for-age Z-scores of children under five years of age, have declined steadily for three years since February 2000 (Soekirman, et al. 2003,) and as of February 2003 remained well below their 2000 levels, and barely above their 1995 levels.

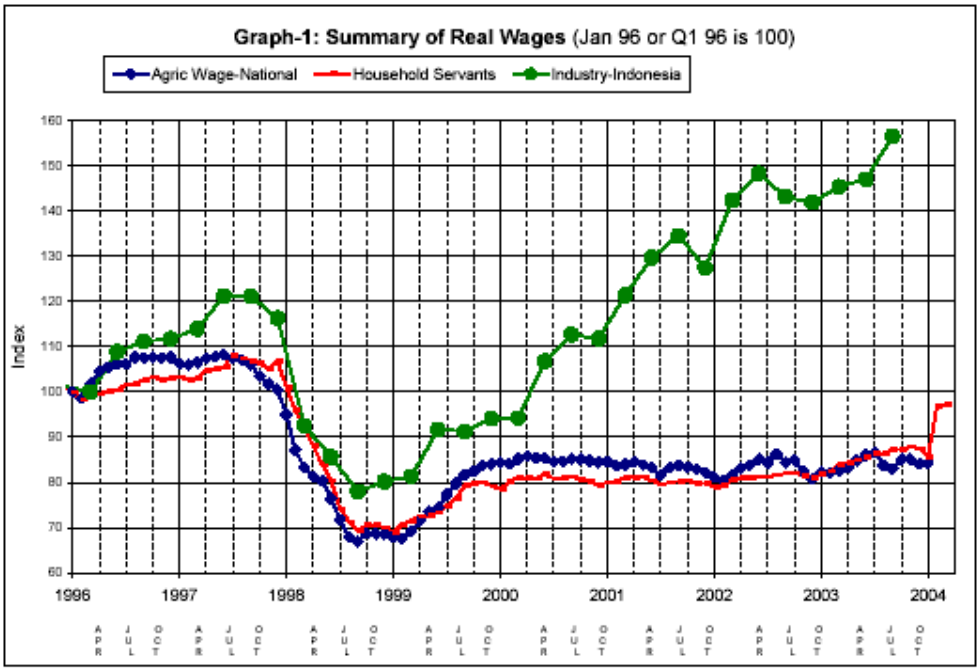
The NI data are probably the most widely cited indicators of Indonesian economic performance, so they certainly deserve close scrutiny. In addition to the 1% decline in real food expenditures reported above, they report that nominal food expenditures grew 24% from Q1 1999 to Q1 2002, implying that food prices rose by 25%. These nominal increases are well below the Susenas-based estimates of 37% increases reported in Table 1. What is more, this rapid rate of food inflation does not match

either BPS's urban CPI data, or the Susenas deflators. The urban CPI data from BPS show that food prices rose 12% between Q1 1999 and Q1 2002 (excluding alcohol and tobacco). This is the same food inflation rate shown in Table 2 from the Susenas data. The NI 1% real food expenditure decline therefore appears to be caused by a large overestimate of food price inflation, and perhaps also due to an underestimate of nominal growth, as well. If we were to apply the 12% inflation rate to the NI's nominal food expenditure growth, then the Susenas and NI discrepancies decline to a difference of growth rates between 24% and 12% – which would be due to differences in estimated nominal growth. While this is still a large difference, both rates suggest relatively rapid income growth since the peak of the crisis.

The time pattern of agricultural wages from January 1996 through January 2004 is displayed in Graph 1, below, taken from the BPS's April, 2004 Poverty Monitoring report to the Cabinet (BPS, 2004). Unlike the NI food consumption statistics, real agricultural wages increased soon after the trough of the crisis in late 1998/early 1999, but they only rose to about 85% of their January 1996 level. These real agricultural wages have been relatively stable at that level since early 2000.

But as with the NI data, the Farmer Terms of Trade Cost of Living deflators used for these real wages are difficult to corroborate. Recently identified technical problems with these deflators have probably led to an overstatement of rural inflation. These deflators grew, on average, 30% from First Quarter 1999 to 2002, while the food price deflators for both the urban CPI foods and Susenas foods grew only 12%, the overall urban CPI grew only 25%, and the food deflator for the poor grew only 9%. But deflator problems may only be a partial explanation for inconsistencies between real agricultural wages and other measures of real welfare. Timmer (2004) addresses this inconsistency directly:

> "Part of the problem is the difficulty of choosing a reliable deflator for nominal wages during a period of rapid relative price changes. Part of the problem is the changing structure of employment between formal and informal [sectors], and the possibility of a short-run break in the strong integration of labor markets seen historically. And part of the problem may be a growing importance of self-employment and remittances in stabilizing household expenditures."



To underscore the potential importance of this schism between agricultural wages and real welfare, Table 6a compares the decomposed nominal and real changes in wages and food expenditures through the crisis. While we do not expect these to track one another especially closely, the largest differences between them are informative. In particular, the largest real discrepancy between these series occurred at the peak of the crisis, when real wages had fallen 31%, but real food expenditures declined only 12%. The real discrepancy since 1999 is far smaller – 21% vs. 23% – so the major difference appears due to the robust food expenditures at the peak of the crisis.

The declining nutrition scores are a particularly difficult discrepancy to understand. Due to both the objectiveness of the measurement, and the importance of children's nutrition to long-term economic development, these nutrition scores should be one of the most important indicators of Indonesian economic welfare.

Table 6a. Decomposed Nominal and Real Agricultural Wages vs. Food Expenditures of the Poor

	Nominal Agr. Wage	Rural CPI	**Real Agr. Wage**	Nominal Food Exps.	Food Deflator	**Real Food Exps.**
Q1'96-Q1'99	80%	160%	**-31%**	142%	175%	**-12%**
Q1'99-Q1'02	57%	30%	**21%**	34%	9%	**23%**
Q1'96-Q1'02	183%	238%	**-16%**	220%	197%	**8%**

Our difficulty lies in understanding how to interpret these nutrition data. From 1989 to 1998, these Z-Scores increased substantially, apparently reflecting the significant improvements in welfare that were also reflected in both real consumption and National Income figures. But a puzzling trend in these indicators appeared at the peak of the crisis. By February 2000, nearly every other indicator of economic welfare reflected what was obvious on the streets of Jakarta and elsewhere in Indonesia – the impacts of the crisis were large and generally bad. But curiously, Table 7 shows that the nutritional status of children actually *improved* significantly from 1998 to 1999 and 2000. Indeed, there was no deterioration evident in this indicator until February 2001. Counter-intuitively, the deterioration from 200 to 2002 occurred even as all other indicators suggested that conditions were finally improving. Even more puzzling, as the 2002 Susenas food consumption reports revealed substantial real improvements in the quantity and quality of foods consumed, these nutrition data deteriorated more sharply than in any previous year.

Table 7. Weight-for-Age Z-Scores: Children Under Age 5, 1989-2003[6]

Year of Survey	Mean (SD's)	Standard Deviation
1989	-1.60	1.10
1992	-1.50	1.20
1995	-1.20	1.60
1998	-1.20	1.60
1999	-1.00	1.60
2000	-0.99	1.48
2001	-1.09	1.40
2002	-1.20	1.41
2003	-1.18	1.44

Prior to publication of the 2001 data, the common explanation given for these robust nutrition results was that Indonesian parents placed a high value on protecting the nutritional status of their children, and despite the economic difficulties, they found a way to get the needed macro nutrients to their children.[7] But the subsequent deterioration in nutritional status after 2001 raises serious questions about this explanation. Would the nutritional status of children become *less* important as incomes improved? Would the parents who were knowledgeable and resourceful in 1999 and 2000 suddenly lose their capacity to protect their children's nutrition?

We do not question the basic results of these Susenas nutrition surveys, because other nutrition survey data give us good reason to trust these broad findings. But what is clear from the pattern of nutrition outcomes through the crisis is that we do not have an adequate model of how parental behavior

[6] Source: Susenas surveys, as reported in Soekirman, et al. (2003)
[7] Increased anemia prevalence suggested that micro-nutrient intake was not protected as effectively as basic calories were (Block, 2003; Strauss, et al., 2004)

mediates the effects of economic shocks on children's nutritional status. Without an appropriate model, it is hard to determine both the long-term impacts of the crisis, and the subsequent recovery on the nutritional status of children.

A Closer Examination of the Price and Expenditure Data

To provide a little more detail on the patterns of real expenditure growth, Table 9 reports the growth in real per-capita expenditures for the 15 food groups identified in the Susenas questionnaire. Note that this table includes alcohol and tobacco, which were omitted from the previous analyses. To facilitate comparability, these statistics cover only the 23 original provinces surveyed in each of the three survey years.

This table repeats the summary message from Table 3 that overall food expenditures increased by 8% (10% including tobacco) from 1996 to 2002. Among the 15 food groups, only three – grains, meats + poultry, and alcohol – experienced real declines, and these declined by 10% or less. Nearly all the others increased by 10% or more, and five of these categories – dairy & eggs, vegetables, beans & nuts, fruit and processed foods – grew by 15% or more. The pervasive, unusually rapid growth of expenditures on high-quality, "luxury" foods underscores the basic surprising results discussed earlier. The rapid growth in food expenditures is reflected both in the level and composition of food expenditures.

Table 9. Susenas Estimated Aggregate Indonesian Food Expenditure Growth[8], By 15-Item Food Category 1996-2002: All Indonesia

Food Category	Real Expenditures			% Change		
	1996	1999	2002	'96-'99	'99-'02	'96-'02
Grains	8,937	8,373	8,317	-6%	-1%	-7%
Tubers	417	366	458	-12%	25%	10%
Fish	3,282	2,768	3,626	-16%	31%	10%
Meats and Poultry	2,317	1,269	2,086	-45%	64%	-10%
Dairy and Eggs	2,107	1,492	2,511	-29%	68%	19%
Vegetables	3,470	3,119	4,047	-10%	30%	17%
Beans and Nuts	1,386	1,341	1,766	-3%	32%	27%
Fruit	2,060	1,372	2,554	-33%	86%	24%
Oils and Fats	1,671	1,504	1,909	-10%	27%	14%
Sugar and Drink Mixes	2,083	1,869	2,344	-10%	25%	13%
Spices	984	765	1,049	-22%	37%	7%
Other (processed) foods	924	773	1,129	-16%	46%	22%
Prepared Foods and Drinks	6,097	5,816	6,932	-5%	19%	14%
Alcohol	51	24	50	-54%	113%	-2%
Tobacco	3,108	3,684	3,995	19%	8%	29%
Total (excluding tobacco)	35,734	30,870	38,414	-14%	24%	8%
Total (including tobacco)	38,893	34,365	42,616	-12%	24%	10%

Conclusion: Implications for Agricultural Policy

Despite the economic crisis, per capita food consumption grew between 1996 and 2002, both for the general population and for the poor. However, all of this growth was in high quality foods such as eggs, fruit, vegetables, fish, beans and nuts, fats and oils, and prepared food. Per capita consumption of these high quality foods grew at an average annual rate of 2% between 1996 and 2002, with growth accelerating to 11% per year between 1999 and 2002. Consumption of starches, by contrast, declined between 1996 and 2002. Since high quality foods such as fruit, vegetables, fish and eggs, are rich in micronutrients, this shift from starches to high quality food suggests an improvement in nutritional welfare. Although there was a slight drop in per capita caloric intake between 1996 and 2002, aggregate expenditures on food were sufficient in 2002 to allow both an increase in caloric intake and an increase in consumption of high quality food, relative to pre-crisis levels. The decision to slightly reduce caloric intake in order to greatly increase consumption of high quality foods appears to have

[8] Grains, tubers, fats and oils, and beans and nuts in these 15-item Susenas-based food categories share the same names as similar food groups in the 6-item groupings. However, they are not directly comparable, as the 6-item groupings shift easily categorized food types out of processed and prepared foods and into their appropriate groups.

been a consumer choice consistent with rising real incomes, both for the poor and for the general population.

In line with the sharp increase in consumption of high quality food, there has been an explosive growth of supermarkets in recent years, with the share of supermarkets in total food retail sales rising from less than 10% pre-crisis to 28% in 2003.[9] Because of problems with quality, reliability, and consistency, supermarkets prefer to import the majority of their fruit and a large share of their vegetables. It therefore appears likely that a significant portion of the 30% growth in consumption of fruit and vegetables between 1996 and 2002 captured in the Susenas survey is being met through imports.[10] With the ongoing explosive growth of supermarkets, this share is likely to continue rising.

Indonesian agricultural strategy is currently focused on "protection and promotion," as explained by the Ministry of Agriculture.[11] Judging from recent policy changes and from Indonesia's trade negotiation strategy, protection efforts are focused on four "strategic" commodities: rice, sugar, corn and soybeans.[12] Most of the government's agricultural resources are also devoted to these four crops, with the goal being to attain self-sufficiency and to minimize imports. However, given the extremely small size of Indonesian farms, this may not be an effective way to raise farm incomes and rural welfare.

Most Indonesian farmers operate less than one-half hectare of land. On such tiny plots it is impossible to produce sufficient income just by growing low value crops such as rice, sugar, corn and soybeans. This is why rice farmers in Indonesia actually earn only 28% of household income from rice, while deriving 33% of household income from non-rice agriculture and 39% from non-agricultural activities.[13] Even a doubling of rice prices would not solve the income problem for households operating such tiny farms, and it would severely harm the nutrition of the poor.

A more effective way to raise farm income is to encourage farmers to switch to high value activities, such as horticulture, livestock, aquaculture and estate crops. High levels of protection for low value

[9] USDA Foreign Agricultural Service, GAIN Report Number**:** ID3028, *Indonesia Retail Food Sector Report 2003*, 11/12/2003. Also see previous GAIN reports.

[10] Per capita consumption of fruits and vegetables grew 19% between 1996 and 2002, measured at constant 1996 prices (see Table 9). Population growth over this period was 1.5% per year, giving total consumption growth of 30% over these six years.

[11] Speech by the Minister of Agriculture at the *National Conference of the University Outreach Network*, Bogor, January 29, 2004.

[12] Jakarta Post, "Rini to rally int'l alliance ahead of WTO meet," Saturday, February 7, 2004.

[13] Handewi P.S. Rachman, Supriati and Benny Rachman, *Struktur dan Distribusi Pendapatan Rumahtangga Petani Lahan Sawah,* Pusat Penelitian dan Pengembangan Sosial Ekonomi Pertanian, 2003.

rice, sugar, corn and soybeans might lead farmers into an income trap, discouraging them from switching to high value activities with better income potential. If this happens, the rapidly growing demand by Indonesian consumers for high quality fruit and vegetables will be satisfied by imports, while Indonesian farmers will be stuck growing low value cereal crops and sugar.

It is sometimes argued that there is no market for horticulture products in Indonesia, and that horticulture is therefore not a realistic alternative for rice farmers. The Susenas data presented above show that the demand for fruit and vegetables is in fact growing very rapidly and may soon exceed demand for rice. Information from supermarkets indicates that much of this growth is being supplied by imports. Indonesian agricultural policy therefore needs to make a choice between two very different strategies. The current focus on self-sufficiency in "strategic" commodities – commodities that will always be low value and cheap on world markets – can be continued, or alternatively, farmers can be encouraged to get out of low value commodities and switch to high value activities such as fruit, vegetables, livestock, aquaculture and estate crops. Unfortunately it is not possible to produce more of everything because of resource constraints. In the real world there are opportunity costs. Devoting more resources to low value commodities will reduce production of high value commodities, leaving Indonesian demand for high value agriculture to be satisfied by foreign farmers.

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Appendix

Unit Values and Prices

Unit values can systematically differ from prices when the itemized commodities are of heterogeneous quality. When consuming heterogeneous consumption items, poorer households may buy cheaper qualities than their wealthier neighbors facing the same prices. These choices should not affect cost of living estimates. Deaton (1997) suggests a practical method to adjust for this quality shading when estimating demand functions. He evaluates the effect of incomes on unit values within the same locations – assuming that neighbors face the same true prices – by using sample block fixed-effects regressions of logged unit values on logged per-capita expenditures. The resulting unit-value income gradient indicates the pure quality effect on unit values.

To determine whether these gradients were large enough to substantively alter our findings, we used this method to compare the differences in unit values of the bottom and top halves of the income distribution. While there were some items with large quality-related differences in prices,[14] the overall unit-value difference between the top and the bottom was less than three percent, declining from 2.8% in 1996 to 2.5% in 1999 and 2002. Since per-capita expenditures of the top half of the expenditure distribution are more than double those of the bottom, this suggests that real income changes of almost 40% are needed to change unit values by more than one percent. As the largest real expenditure changes we find in these data are less than 25%, the distinction between prices and unit values cannot account for more than 1% of the difference.

A Measurement Issue: Do Different Deflators for the Poor Matter?

To evaluate the importance of income and location-specific deflators, Table A1 presents three different measures of deflated expenditure growth of the poorest quintile. The first column uses a deflator calculated directly from the food consumption patterns of the same quintile. The second column uses the overall population deflator, and the third uses a deflator based on the expenditure patterns of urban residents.

Comparing the third column with the first reveals that urban inflation was substantially lower than overall, implying that the growth of deflated expenditures of the poor, if based on an urban population deflator, would substantially overstate the increases in deflated expenditures.

[14] The largest unit value differences found (in excess of 10%) were for relatively heterogeneous goods, such as other animal-based foods, dairy products and other milk products and canned fruits, as well as for goods without fixed quantities, such as prepared foods, for which expenditures are reported per "standard serving". Surprisingly large differences (>7%) were also found for apples and star fruit. A few puzzling large negative differences for also stood out. These included cheese (-60%), preserved meats (-15%), and cashews (-10%).

Table A1. Impacts of Deflator on
Change in Deflated Food Expenditure 1996-2002

Food Group	Deflator Used: Quintile Specific	Overall	Urban
Tubers & Grains	-2%	-2%	6%
Oils & Fats	22%	21%	24%
Beans & Nuts	28%	26%	49%
Animal	12%	21%	64%
Others	21%	27%	59%
Total	8%	11%	33%

Examination of Extreme Changes

Table A2 adds more detail to help evaluate the credibility of these data. It lists the food items with gross volume growth in excess of 200%. This helps evaluate the overall quality of the data, as well as to see whether unreasonable outliers drive the large increases in expenditures seen from 1999 to 2002. Three of these items, Canned Meats, Cheese and Canned Fruit could be due to large sampling errors driven by small numbers of households reporting consumption. Each of these items has fewer than 200 households reporting any consumption in any year. But since these numbers are so small, their effect on total expenditures are negligible. Another three or four of the outliers are seasonal fruits (Rambutan, Duku, and Durian, and perhaps "Other fruit".) The reported increases may have been caused by changes in the growing seasons preceding the February surveys. Duku are especially curious, but not very important. In '99 less than 0.5% of all households consumed *any*, while in '02 more than 10% did. But since omitting them entirely would still leave total fruit expenditure growth above 100%, their role is little more than a curiosity. Nearly all of these stand out as specialty, or luxury foods, for which small changes in consumer demand, along with responsive supplies, could plausibly induce large proportional increases in consumption. Thus these large increases appear plausible (if indeed food demands increased by 24%), and they are not large enough that their exclusion would dramatically alter the pervasive shift to higher quality foods.

In terms of their potential for promoting income growth, it is notable that five of the items are processed foods (Canned Meats; Canned Fruit, and Packaged Fruit juices; as well as Cheese; and Health/energy drinks.) The seasonal fruits, as well as the remaining four items (Quail eggs, Petai, Apples, and Melons), all could represent income opportunities for farmers if demand continues to grow.

Table A2. Extreme Expenditure Growth:
13 Food Items with >=200 Nominal Expenditure Growth, 1999/2003

Item	Ratio: Qty.2002/ Qty.1999
Canned Meat	5.1*
Quail eggs	4.7
Cheese	3.9*
Petai	3.4
Apple	3.7
Rambutan	3.9
Duku	48.3
Durian	6.1
Melon	5.3
Canned fruit	3.2*
Other fruit	5.7
Packaged Fruit juice	3.0
Health /energy drink	3.7

* Fewer than 200 households reported any consumption

Figure 3. Per-Capita Calories, by food Type

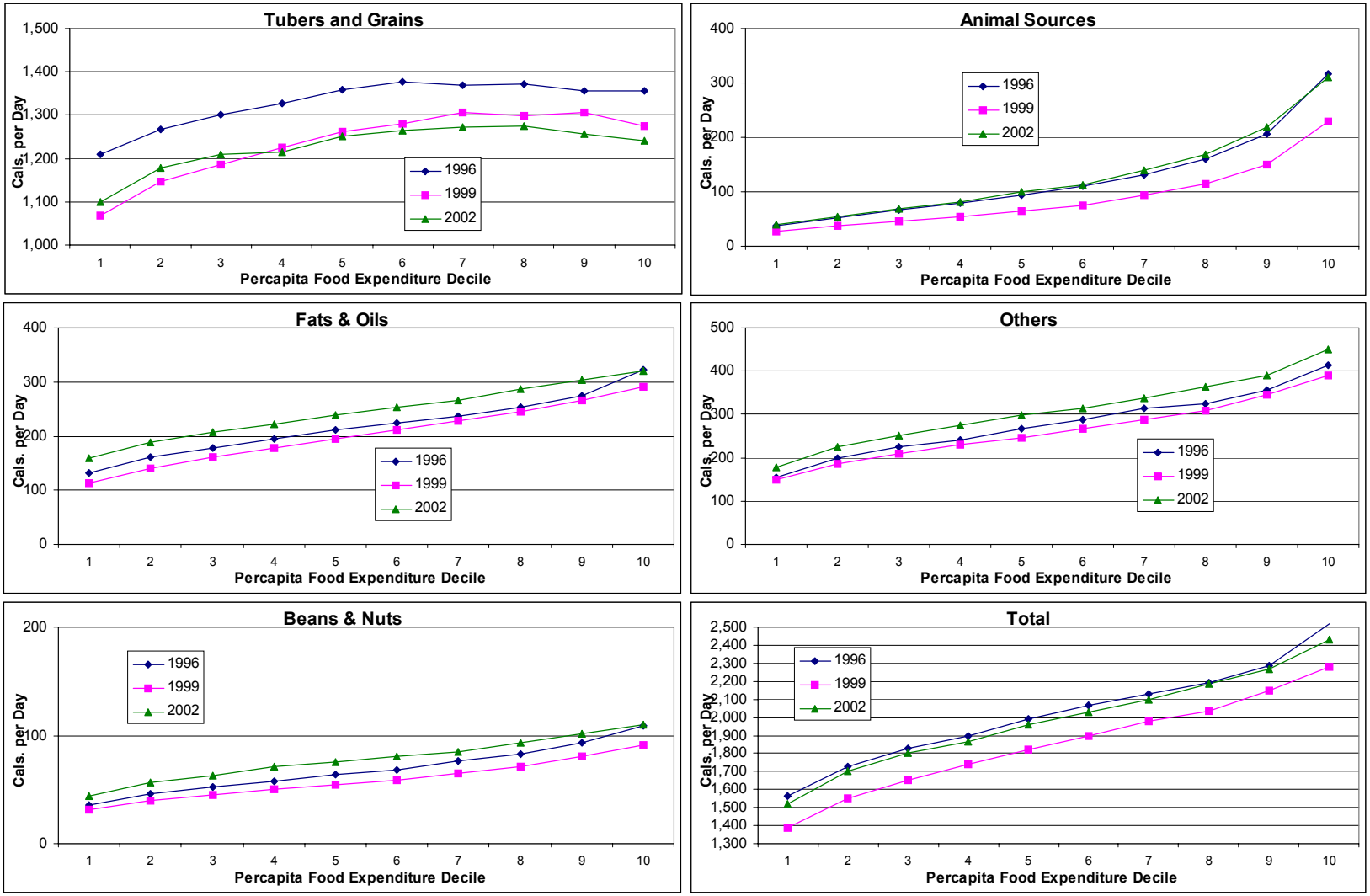

Figure 4. Per-Capita Nutrients, by Income and Year